

EXECUTIVE SUMMARY

The coastal zone of North Carolina that we know today is not permanent. It has evolved throughout its history. These changes, which can be both imperceptibly gradual or sudden and violent, continue today and will do so into the future. Humans are moving into this environment in ever increasing numbers accompanied by towns, industry, tourism, and the supporting infrastructure of services such as roads, bridges, water, power, and waste disposal. The changing coastal system is not fragile. It is the fixed human infrastructure that can easily be destroyed by natural processes. This is the coastal conflict that we must examine closely and then manage. The climate is changing; tropical storms and hurricanes will continue to strike our coast as will nor'easters, and sea level is rising at an increasingly rapid rate. We must accept these changes as inevitable but we seem reluctant to do so. This is why our coasts are in crisis.

The coastal system of North Carolina is incredibly varied, with rivers, swamps, estuaries, marshes, barrier islands, inlets, beaches and offshore shoals and rock. In the south, barrier islands are short, with many inlets, and are close to the mainland. In the north, the barrier islands are long and narrow, with few inlets, and they extend out into the Atlantic Ocean leaving an immense estuarine system of sounds behind them. This spatial variety of our coasts means that coastal management issues vary considerably from place to place.

Tide gauge and historical data demonstrate that relative sea level is currently rising in northeastern North Carolina at a rate of 16 to 18 inches per century. One hundred years ago, the rate was 7 inches per century and 200 years ago it was only 3 inches per century. The rate will likely continue to increase into the future as climate continues to warm. The warming climate might also spawn more frequent and intense hurricanes. When so much of down-east North Carolina is just a foot or two above current sea level, we must take note. The future will likely see accelerated rates of coastal erosion and associated loss of urban infrastructure, agricultural land, wetlands, and segments of barrier islands. In addition, there will likely be increased economic losses due to floods, droughts and storms with a potentially serious impact on the state's coastal tourism and recreation

economy – unless we accept and plan for environmental change, and adapt.

We know that rising sea level, resulting from melting of the last Ice Age's glaciers and ice sheets, began to affect the area of our modern coastal zone about 12,000 years ago when rising ocean level flooded into the Roanoke River valley and gave birth to Albemarle Sound. The Neuse and Tar rivers to the south and their tributary, Pamlico Creek, began the transition to estuaries approximately 7,000 years ago. The barrier island system began to form about 3,500 years ago in a position very close to its current location. Since that time, development of barriers has been influenced by opening and closing of inlets and collapse and reformation of portions of the Outer Banks, occasionally exposing southern Pamlico Sound to oceanic influences. In the one hundred years or so before the first Europeans arrived in 1584, the barrier islands took a form similar to that of today.

During the 20th century, human development and engineering have become a dominant force in disrupting natural coastal processes and modifying coastal evolution. Roads and bridges have been built on mobile barrier islands. Barrier dune-ridges were constructed to protect the roads but, in doing so, have curtailed the natural processes of barrier island growth and migration. Jetties have been built to stabilize the location of inlets but, in doing so, have disrupted the natural process of along-shore sediment transport. Resulting coastal erosion has been addressed by expensive beach nourishment programs, but they have not been particularly successful; they must be repeated indefinitely, and suitable sand is hard to find. Sand dredged from navigation channels is often dumped too far offshore for natural beach renourishment to occur. Stabilization structures, such as jetties, groins, bulkheads, and sandbags demonstrably cause erosion problems. Inlets open naturally, and we close them almost immediately before they can do their work of building island width by adding sand to the barrier island system. Wetlands are filled, bulkheads are constructed, and ecosystems disrupted. Storm-water is increasingly hard to manage as we pave more of the land's surface, compromising water quality in the rivers and sounds.